DEPARTMENT OF PHYSIOLOGY, PHARMACOLOGY, METABOLISM AND CARDIOVASCULAR SCIENCES

Annual Report

July 1, 2005 - June 30, 2006

1. EXECUTIVE SUMMARY

The past year (2005-06) was a difficult one for faculty and staff of this new Department, which resulted from the mid-year merger of the Departments of Physiology and Pharmacology. The purpose of the merger was the consolidation of two departments with closely related teaching responsibilities and research activities in order to permit significant investment in selected research programs (metabolism and cardiovascular sciences), during and after the process of consolidation. Though the administrative leadership has kept its promise of using the merger as a means to build rather than downsize, losing an old home is never pleasant, and adjusting to change is always painful. Following is a summary of the changes to date, all of which are still in progress.

a. Limited office and laboratory renovations related to the merger have been planned and are underway. These, and previously initiated construction in the Block Health Science Building, have seriously disturbed our work, but promise to be beneficial in the near future.

b. Records, accounts, and budgets of the two previous departments have been put in order, and mostly integrated. We anticipate the smooth administrative operation of the Department when renovations are completed, permitting the relocation of our capable staff in a central department office.

c. In keeping with COM's "Commitment to Excellence in Medical Education", this Department has started to determine who is teaching what and where, and to organize the considerable, but scattered teaching contributions of the individual faculty into a collective departmental educational program. This is essential since the Department is now being held responsible for the teaching of the contemporary contents of the disciplines of Physiology and Pharmacology. In this direction, i.e., focusing on a departmental teaching responsibility, we have a long way to go.

d. The consolidation of the research resources (major equipment and shared facilities) of the parent departments has been initiated. However, this necessary aspect of the merger of the two departments has been hampered by the slow pace of the indicated renovations, construction, and moves.

e. The Center for Diabetes and Endocrine Research (CeDER) has been established, and recruitment of new CeDER faculty has been started, but not completed. CeDER's move to its new quarters also awaits completion of the ongoing construction. Nevertheless, this center, under the direction of Dr. Najjar, is functional, visible, and on the move.

f. Significant time and effort has been devoted to the start of the organization of the cardiovascular research component of the Department, as envisioned in the original merger plans. There has been little visible success in this direction, due to what may aptly be called institutional politics. It remains to be seen if this lost opportunity can be regained.

In the midst of the above changes, the Department's outstanding faculty and staff have continued to serve the institution, as reported below.

2. CHAIR'S SELF ASSESSMENT

2005-06 and 2006-07 Goals: I accepted the invitation of Dr. Gold to Chair this newly established/merged Department (see below) with the somewhat indefinite, but short-range goals of (a) achieving the orderly amalgamation of the administrative, educational, and research activities of the parent departments; and (b) initiating the further development of the Department's research focused on cardiovascular and metabolic diseases. These will remain the goals for 2006-07, and perhaps for 2007-08. What have I accomplished? With the help of many, and in spite of the indifference of some others, significant changes in the direction of the goals have been made. However, I have doubts about the value of "self-assessment". It reminds me too much of Stalin's Soviet Union and Mao's China, where people were exiled to terrible places to self-evaluate and repent. I suggest that others should evaluate the performance of this Chair and the quality of progress toward the above goals.

3. DEPARTMENT HIGHLIGHTS & NOTABLE EVENTS

Merger was the most notable event. The academic year 2005-06 started with MUO's College of Medicine having a Department of Physiology and Cardiovascular Genomics housed on the 3rd floor of the Block Health Science Building, and a Department of Pharmacology, Cardiovascular Biology and Metabolic Diseases, located on the 2nd floor of the Block Health Science Building. Because the Interim Chair of the former (Dr. J.I. Shapiro) and the Chair of the latter (Dr. H.C. Rosenberg) had indicated that they wished to be relieved of the responsibilities of these positions, the institutional leadership was compelled to review the administrative status of the two departments. On 12/14/05, the Dean of the College of Medicine, Dr. J. Gold, announced the merger of these two departments into one, establishing the new Department of Physiology, Pharmacology, Metabolism and Cardiovascular Sciences, effective 1/1/06, and outlining its new missions (Attachment 1). Since then, the Department's faculty, staff, and the new Chair have been focused on the task of integrating resources, evaluating programs, and reorganizing when necessary. In spite of the expected difficulties of these merger-induced processes, our outstanding faculty members have continued to remain productive, not only to advance their careers, but also to keep this medical institution visible among its national and international peers. Some of the highlights of their achievements, indicating professional recognition outside of our institution, are listed below:

Dr. A. Askari organized and chaired a symposium on "Signaling via Na,K-ATPase" at the 11th International ATPase Conference, Woods Hole, MA (September 6-11, 2005). Dr. Askari was also an invited speaker at the international conference on "Molecular Mechanisms and Regulation in Cation Transport ATPases and Related Genetic Diseases", held in Kyoto, Japan (June 16-18, 2006).

Dr. A. Beavis served on the Editorial Board of *Cell Biochemistry and Biophysics*.

Dr. J. Chakraborty was a selected program reviewer during the year for the "XVI International Aids Conference" held in Toronto, Canada. For the second year in a row, Dr. Chakraborty was also selected to review grant applications submitted to the World Bank, Washington, D.C.

Dr. G. Cicila co-chaired a session at the "Rat Genomics and Models" meeting held at Cold Spring Harbor Laboratory, New York (December 2005).

Dr. M. Garrett served as an invited ad hoc member of an NIH Special Review Panel (NIAID). He also served on the Editorial Board of the *Journal of Hypertension*.

Dr. B. Joe was an invited speaker at the prestigious "Rat Genomics and Models" meeting held at Cold Spring Harbor Laboratory, New York (December 2005).

Dr. R. Mellgren served on the Editorial Board of the *Journal of Biological Chemistry*.

Dr. S. Najjar served as a regular member of two NIH Study Sections: "Integrative Physiology of Obesity and Diabetes" and "Endocrinology, Metabolism, Nutrition and Reproductive Sciences". She also served as ad hoc member of three other NIH study sections during the year. Dr. Najjar was an invited speaker at the annual meeting of the "Endocrine Society", Boston, MA (June 2006), and at the "20th International Medical Convention of Arab American Medical Association" held in Amman, Jordan (June 2006).

Dr. E. Sanchez was an invited speaker at two national/international meetings: Keystone Symposium on "Tissue-Selection Nuclear Receptors", held in Breckenridge, CO (September 2005); and the "Endocrine Society" Annual Meeting (June 2006). Dr. Sanchez also received a special recognition because one of his funded grant applications with a priority score of 125 (2.8 percentile) was selected and presented at a national meeting by NIH to be used in a model for new investigators. Dr. Sanchez also served as an ad hoc member of a Study Section of NIH, and was on the Editorial Boards of four journals.

Dr. E.I. Tietz was named, for a term of three years, to National Society for Neuroscience Program Committee. This select committee plans the scientific programs including the symposia of this prestigious society.

Dr. J.W. Turner, Jr. was the recipient of the 2005 "Forest Service Chief Award", given to one person annually by the U.S. Forest Service for "exemplary volunteer service and effort". This was in recognition of Dr. Turner's sustained research in wildlife management. Dr. Turner also served as ad hoc reviewer for NSF and USDA grant programs.

Dr. Z. Xie was a Scientific Advisor to the "Fourth International Cellular and Molecular Biology Congress" held in Poitiers, France (October 2005), and was the organizer of an international conference on "Molecular Mechanisms of pumps, channels and transporters-mediated signal transduction" at the meeting. Dr. Xie was also an invited speaker at the 11th International ATPase Conference, Woods Hole (September 2005), at "The 3rd Key Symposium of Royal Swedish Academy of Sciences (May 2006),

and at the international conference on "Molecular Mechanisms and Regulation in Cation Transport ATPase, and Related Genetic Diseases" (Kyoto, Japan, June 2006).

Another notable event of the year was the departure of a faculty member (Dr. D.L. Pittman) for greener pastures. This was of mutual benefit to him and the Department.

4. DETAILS OF EDUCATION, RESEARCH, CLINICAL SERVICES, AND ADMINISTRATIVE & UNIVERSITY SERVICES

4a. Education:

Twenty of our 28 faculty members contributed a total of 585 hours of didactic teaching to various formal courses of the COM, CHS, CGS, and CON. We also devoted 108 contact hours to the PBL course in the COM. The details of these contributions are presented in Table 1. It is appropriate to note that we have not gathered information on "preparation/grading" time, and the faculty time spent advising/instructing individual students.

4b. Research:

Effort/time: Estimate of faculty effort devoted to research is included in Table 2. There were also 24 postdoctoral fellows and technical staff in the Department who devoted 100% effort to research.

Space:

Providing information on our laboratory/office space is problematic. As a consequence of the Physiology/Pharmacology merger, some additional space on the first floor of Block Health Science was assigned to the Department, and some space on the third floor of Block Health Science was taken away. In addition, many have been displaced and/or transferred from their offices and laboratories due to merger-induced reorganization and renovation/construction within the Block Health Science building. We anticipate that by the end of 2006-07 it will be possible to list again the space that is being used by our Department.

Funding:

The amount of the Department's extramural research funds is summarized in Table 3, provided by our Research and Grants Office.

Description of Research & Results:

The nature of the active research programs, and the recent findings, of our faculty are described below, as summarized by each member.

Dr. Amir Askari - The laboratory has had a long-standing interest in the mechanism of ion transport across biological membranes, with a major emphasis on the properties and functions of (Na^+,K^+)-ATPase (the sodium pump) of the eucaryotic plasma membrane. Current work of the laboratory is primarily on the digitalis-induced interactions of (Na^+,K^+)-ATPase with non-ATPase proteins, leading to the newly discovered functions of (Na^+,K^+)-ATPase as a signal transducer that regulates growth of the cardiac myocyte. Recent findings include the discovery that in cardiac myocytes the caveolar inpocketings of the sarcolemma and t-tubules contain more than 90% of the functional sodium pumps. These cave-like structures of the cardiac cell surface, therefore,

seem to be the main portals for ion transport in the heart, and the sites where digitalis drugs regulate cardiac contractility and growth.

Dr. Joana Chakraborty - Currently, I am working on two major projects: a) educational and epidemiological studies and b) biomedical research on development of a mouse model. The goals of the first project are: to develop educational materials, to offer courses to medical, nursing, allied health students and practicing physicians, and to provide opportunities to interact with people living with AIDS, and also to conduct epidemiological studies on HIV infection in developing countries and the impact of AIDS on women and children. The goal of my second project is to develop an animal model to study the transmission of retroviruses and their effects. This model has been developed by using the ts-1 virus in BALB/c mouse. We have further established that this model can be useful for the study of AIDS related malignancy, such as lymphoma. Currently, we are studying the common integration sites (CIS) of the viral genome into mouse genome causing lymphoma. Thus far we have identified 121 viral genome integration sites (IS) on 16 different chromosomes with 30% located within the genes (intra-genic). We are now planning to extend this work in patients with AIDS and lymphoma.

Dr. George Cicila - Our laboratory is focused on the study of cardiovascular quantitative traits. The first project involves studying blood pressure in the Dahl rat model where Dr. Lee and I have used congenic strains and substrains to characterize multiple blood pressure (BP) quantitative trait loci (QTLs) at the q-terminus of rat chromosome 3 (RNO3). Dr. Lee and I have bred and tested additional congenic substrains to further delimit the RNO3 BP QTL-containing intervals and are using gene expression profiling of kidneys from these congenic strains (with the parental S strain) to identify superior candidate genes. In collaboration with Dr. Joe, Dr. Lee and I are examining the interactions of multiple congenic intervals containing BP QTLs that are being introgressed into a Dahl S rat. The goal of this project is to examine the interactions of genes responsible for the different BP QTLs and to use such information to identify and define specific pathways through which they influence BP, as well as the responsible gene(s). The second project involves study of aerobic running capacity (ARC) and related quantitative traits (cardiac performance, lipid metabolism/obesity, and methylation) using the high performing DA rat strain in conjunction with the low performing Copenhagen (COP) and Buffalo (BUF) rat strains. Dr. Lee and I are using congenic strains bred from DA and COP rats to examine ARC quantitative trait loci on rat chromosomes 16 and 3, and the effects of these congenic regions on ARC, fat metabolism and depots, and cardiac performance. Dr. Lee and I are also studying a segregating population of F_2(BUFxDA) rats to identify QTLs for ARC, abdominal fat depots, methylation potential, circulating factors (free fatty acids, triglycerides, etc.), and organ weights. Of interest is our identification of an association between the DA-rat and BUF-rat mitochondrial DNA and ARC, subcutaneous fat weight, and liver S-adenosyl methionine and S-adenosyl homocysteine levels. Naturally occurring mutations in mitochondrial DNA have not previously been associated with alterations in quantitative traits in rodent genetic models.

Dr. Michael Garrett - Chronic kidney disease (CKD) is an important healthcare problem with increasing incidence and prevalence worldwide. Unfortunately, knowledge of the genetic factors that cause CKD or progression to renal failure is limited, except for some rare monogenic forms of the disease. Hypertension and diabetes are the two most important factors contributing to renal failure. It is my goal to understand the genetic basis of renal disease observed in the Dahl salt-sensitive (S) rat, a model of *hypertension*-related renal disease. The assumption (as with all models of human disease) is that knowledge gained using an animal model will foster understanding and treatment of human disease. Previously, I carried out a genetic analysis for several renal and cardiovascular traits using a population derived from the S and the spontaneously hypertensive rat (SHR). The study identified ten genomic regions linked to renal damage and/or function. The studies initiated

over the past year were aimed at identifying the gene(s) located on rat chromosome 2 using a positional cloning approach (congenic strain analysis). A comprehensive approach was employed that examined several renal parameters, histology, electron microscopy, gene expression analysis, and gene pathway analysis to characterize the congenic strain versus the parental strains. In total, the detailed analysis revealed that a mechanism involving fibrosis appears to be linked to the renal susceptibility gene on this chromosome. Fine-mapping using positional cloning techniques reduced the chromosomal interval to contain 64 known and/or predicted genes, including several interesting candidate genes. A manuscript reporting this research is to be submitted for publication in the next month. Studies to be performed in the next year are aimed at reducing the number of candidate genes to less than 10 and to investigate the altered fibrotic response observed in the congenic strain. Additional studies are aimed at beginning work on dissecting the genetic basis of other chromosomal regions linked to renal damage and/or function.

Dr. Bina Joe - During this year, I have continued research in the area of genetics of hypertension and identified a putative novel role-player in the etiology of hypertension. A patent application to protect information regarding this gene is contemplated. An ongoing collaborative project with The Institute for Genomic Research in Maryland has resulted in the identification of complex transcriptional networks underlying the control of blood pressure. Future research plans include functional studies on the novel gene that is identified to control blood pressure. Depending on the availability of grant support, experiments to translate this finding to human essential hypertension will be conducted.

Dr. Soon Jin Lee - Project 1: Rat chromosome 3 (RNO3) blood pressure (BP) quantitative trait loci [QTL(s)] in collaboration with Dr. Cicila. At least two BP QTL have been identified within a ~3.3 cM region using 6 congenic substrains. I am using differential gene expression in key organs, such as the kidney, as a tool to identify possible candidate genes. Rtel1 (regulator of telomere length 1) is found as a candidate gene for RNO3 BP QTL. Its differential expression was confirmed in qRT-PCR and sequence differences in S and R allele is found.

Project 2: Study of β-endorphin production in a rat genetic model of aerobic running capacity (ARC) in collaboration with Dr. Cicila. I am using ARC rat model to study innate differences in production of β-endorphin in response to exercise. Strain differences were found in the β-endorphin levels in the basal plasma and in the periaquaductal gray area. β-endorphin levels in the heart and skeletal tissues will be studied and relate to glucose and fatty acid metabolism during exercise.

Project 3: Gene expression study in koi fish under stress. I am collaborating with Dr. Turner on a gene expression study of fish under stress, a model he has developed. We collected tissue samples from fish under nitrate stressor and control group. RNA were isolated from these samples and ready to do qRT-PCR to study expression of stress-related genes.

Project 4: Virus induced lymphoma in a mouse model. I am collaborating with Drs. Chakraborty and Duggan to identify common integration sites (CIS) of viral genome in T-cell lymphoma model that she has developed. We identified 186 viral integration sites on mouse genome and found the expression of 15 genes located at, or near, CIS that were affected by their integration. We plan to use the same technique to identify HIV-1 integration sites in lymphoma tissue of AIDS patients to develop the kit to screen AIDS patients who are susceptible to lymphoma development.

Dr. Lijun Liu - I continue to work on my project on “Control Mechanisms of Cardiac Proteins and Enzymes”, NIH (Program Project Grant 2003-2008). My recent finding is on the cell survival pathway in cardiac myocytes through Na/K-ATPase. Future plans are cell growth regulation mechanism through Na/K-ATPase and the roles of caveolins on Na/K-ATPase related cell growth regulation.

Dr. Ronald Mellgren - For the past 1½ years, I have been investigating the calpain cysteine proteinases and their involvement in plasma membrane repair. In collaboration with Dr. Paul McNeil, an expert on plasma membrane repair at the Medical College of Georgia, I have found that the conventional calpains are required to repair damaged cell membranes of fibroblasts and several other cell types. We are currently studying the mechanism for calpain-mediated repair. A revised manuscript describing our initial studies is in review.

Dr. Nikolai Modyanov - My current research is focused on functional characterization of the betam proteins (the last identified members of the X,K-ATPase β-subunit family) encoded by orthologous ATP1B4 genes, which were discovered in my laboratory. During the report year we determined that physiological functions of betams radically changed during vertebrate evolution. They are genuine Na,K-ATPse β subunits in fish, amphibian and avian species, bur lost this ancestral function in placental mammals, in whose betams are involved in regulation of the TGF-β/Smad signaling pathway acting as regulators of transcription. These data provide the basis for grant proposal (under preparation) "Role of Mammalian Beta M Protein in Heart and Skeletal Muscle Development".

Dr. Sonia Najjar - I have focused on studying the role of an insulin receptor substrate, termed CEACAM1, in insulin action, clearance, obesity, fatty liver disease and cancer. In this venue, we have established many novel mouse models of obesity and diabetes and advanced many novel findings in the field.

Because of the motivation and the hard work of my graduate students, I have made substantial impact on the field of metabolism. I have gained numerous federal and non-federal funds, and published several papers in journals with high impact factor. I have trained my graduate students by working closely with them, conducting weekly data club, and carrying out daily individual scientific discussions, during which we derive and redefine the hypothesis and analyze experimental observations. I believe that this training style helps them develop into reliable independent scientists.

Dr. Sumudra Periyasamy - Role of tetratricopeptide repeat (TPR) proteins and their ligands in the androgen receptor signaling pathways. The FK506-binding proteins (FKBP52, FKBP51) and the cyclosporine A-binding protein (Cyp40) are tetratricopeptide repeat (TPR) proteins that associate with steroid receptors including androgen, progesterone, estrogen and glucocorticoid receptors. Although well-studied, little is known of how these proteins control steroid receptor physiology and pathologies. We have recently made FKBP52-deficient mice whose principal phenotype is reduced fertility in males and sterility in females. Male infertility was due to hypospadias (failure of tubercle closure in the developing penis), which was partially reversed by testosterone, suggesting a defect of androgen receptor (AR) function. Interestingly, the prostate gland and seminal vesicles were dysgenic in (-/-) males, yet all other AR-regulated tissues and functions appear to be normal in these animals. In addition, the expression levels of FKBP52, FKBP51, CYP40 and PP5 were higher in prostate cancer cell lines compared to normal prostate epithelial cells suggesting that over-expression of TPR proteins may contribute to the etiology of prostate cancer. Moreover, treatment of prostate LNCaP cells with TPR protein ligands, FK506 and Cyclosporine A inhibited androgen-dependent stimulation of cell growth and transcription. Together, these findings indicate that TPR proteins and their cognate ligands have the potential to selectively regulate AR physiologies and pathologies. Now we propose to investigate the role of FKBP52 and other TPR proteins in AR function using mouse embryonic fibroblast (MEF) cell lines derived from (+/+) and (-

/-) embryos of FKBP52, FKBP51 and CYP40 wild and Knockout animals as well as prostate cell model systems.

Dr. Sandrine Pierre - *Physiological Significance of Na,K-ATPase Diversity*: We have identified regions of structural diversity among the Na,K-ATPase alpha isoforms that are involved in their specificity of regulation by Protein Kinase C. We are currently focusing on a mutant of the alpha1 isoform that displays altered regulation compared to the wild type sequence. Preliminary data suggest that the difference is due to a modification of the functional regulation of proteins already expressed at the membrane, rather than an alteration of the trafficking as initially predicted.

Cardiac Na,K-ATPase in Ischemia-Reperfusion Injury: We have obtained evidence that a transient exposure to a low concentration of ouabain before the onset of ischemia significantly improves the recovery of cardiac function, a phenomenon known as preconditioning. Our first goal is to characterize the underlying mechanisms. Contrary to other agents capable of preconditioning, ouabain exerts a deleterious effect on the recovery when applied after the ischemic insult. Our second goal is to describe the mechanisms involved in that effect, with special emphasis on the signaling and pumping functions of the cardiac Na,K-ATPase ouabain receptor itself. These studies will involve the use of isolated mouse heart preparations.

Dr. Yasser Saad - I am currently continuing my work refining the rat blood pressure quantitative trait locus found on rat chromosome 10. A manuscript was recently submitted showing a list of 18 candidate genes, three of which contain novel non-synonymous variants. Congenic substrains within the refined region were obtained and recently tested. Further refinement was already attained (13 genes) by testing some of those congenic substrains. Further testing of the other congenic substrains will help localize the candidate gene further. Confirmation of the blood pressure localization will be possible using a single minimal congenic substrain trapping the minimal number of genetic variations between the Dahl-S rat and the introgressed Lewis alleles. I am also working on establishing an independent project under the supervision of Dr. Najjar. I am currently working on cloning of a novel soluble form of the mouse CEACAM1 into an expression vector. The protein expressed in culture will be used as bait in a pull-down assay in efforts to pull-down proteins that interact with the soluble form of CEACAM1. This protein-protein interaction will be evaluated for its potential role in diabetes, cardiovascular disease, and cancer. Another pilot study is in progress with Dr. Garrett evaluating the metabolic phenotype of currently established congenic substrains of Dahl-S and SHR rat strains.

Dr. Edwin Sanchez - My laboratory investigates the mechanism of steroid hormone action, with an emphasis on the roles played by molecular chaperones in control of steroid receptor function. We study these events at the molecular, cellular and physiological levels. Our recent findings indicate that the TPR molecular chaperone FKBP52 is essential to steroidal control of both male and female fertility, by controlling the actions of androgen and progesterone receptors, respectively. Future studies include an investigation of FKBP52 in control of metabolic functions through effects on the glucocorticoid receptor.

Dr. Elizabeth Tietz - My lab has investigated the GABAergic mechanisms underlying benzodiazepine (e.g. valium) tolerance for > 20 years (RO1-DA04075-10-15). We are in the second year of a 5-year NIDA grant (RO1-DA01834-01-05) to study the mechanisms underlying the withdrawal-anxiety associated with benzodiazepine dependence. We have found that excitatory receptor (AMPA and NMDA receptors) in the hippocampal area of the brain are biphasically regulated during benzodiazepine withdrawal. Recent studies by my students Jun Song and Guofu Shen show that the mechanisms underlying AMPA receptor trafficking and channel conductance are very similar to the mechanisms underlying the most prominent model of learning and memory (long-term potentiation, LTP) suggesting that the brain uses very similar strategies to respond to a variety of activity-dependent events. However, unlike with LTP, my student Kun Xiang has found that voltage-

gated calcium (VGCC) channels, rather than NMDA receptors, mediate the calcium signaling related to the functional and structural changes in AMPA receptor channels. Interestingly, increased VGCCs-mediated calcium influx, perhaps mediated by a direct effect of benzodiazepines on VGCCs, may underlie the delayed regulation of GABA receptor function, which contributes to benzodiazepine tolerance. These latter studies served as the basis for the competitive renewal of my 15-year NIDA grant. Though the grant was unfunded, the preliminary data are sound and it will be resubmitted in February (or July). The GABA receptor single-channel studies of my postdoctoral fellow, Paromita Das, which measured these profound changes in GABA receptor single channels function (open probability, GABA affinity and subconductance state) in benzodiazepine-treated hippocampal cells, served as the basis for an Epilepsy Foundation of America Postdoctoral Research Training Grant, pending review. She also submitted a letter of intent to the Pediatric epilepsy foundation, but has not heard if they will invite an application. Two of my Ph.D. students (Song and Xiang) are anticipated to graduate in May. At that point, I will likely accept one additional student. Active research collaborators include Dr. L.J. Greenfield, Jr., Department of Neurology; Dr. D. Giovannucci, Department of Neurosciences; Dr. William Gunning, III, Department of Biochemistry and Cancer Biology, and Pathology; and Dr. Francisco Alvarez, Department of Neurosciences, Cell Biology, and Physiology.

Dr. John W. Turner, Jr. - Research is environmentally oriented with 2 major directions: 1) development and testing of a multi-year duration, reversible wildlife immunocontraceptive, and 2) assessment of deterioration of marine environments and their inhabitants via cortisol measurement in fishes. The contraceptive studies currently focus on use of controlled-release bioerodable polymers to sequester booster doses of contraceptive under in vitro and in vivo field conditions. Future studies are planned to determine contraceptive impact on population growth and its application to wildlife management. The fish studies, both current and planned, involve laboratory and field components. The lab effort is to determine a hierarchy of aquatic stressors and to identify possible impact of these stressors on genes regulating cortisol production. The field effort is directed at use of fish fecal cortisol monitoring as an early-warning indicator of aquatic stress.

Dr. Xiaodong Wang - My laboratory is primarily interested in the mechanisms of folding, assembly and intracellular trafficking of cell surface transporters and receptors. Currently, we have been using the cystic fibrosis transmembrane conductance regulator (CFTR), a plasma membrane chloride conductance regulator, as model to understand the cellular machinery and mechanism for its maturation and exocytic trafficking. Recently, we identified complex ER-associated folding machinery consisting of components on both sides of the ER. We have been functionally characterizing their roles in the maturation of CFTR. We have identified multiple components that regulate the conformational maturation of CFTR, and we will further study the organization of these components and their regulation in an attempt to achieve a complete functional view on the biological process of the ER-associated conformational maturation. Our study will provide fundamental molecular basis for the pathophysiology of an increasing number of human diseases known as the “protein misfolding and misprocessing diseases”, which include cystic fibrosis, hereditary emphysema, congenital long QT syndrome, familial hypercholesterolemia, certain types of diabetes, and a number of endocrinological diseases such as hypogonatropic hypogonadism and Laron syndrome. The research will also potentially lead to the development of therapeutics for the correction of the protein processing defects in the above diseases.

Dr. David Weaver - As Director of the GCL, duties include processing experimental samples, billing of services, ordering of supplies, general center operations of maintenance on machinery, and budgeting. The majority of efforts involve processing and analyzing generated data from research samples provided by grant-supported MUO/UT users. Considerable effort has been put forth in working with researchers in understanding the software for mining of significant results. With the discontinuation of the Data Mining Tool for the

Affymetrix platform, the GCL has started an evaluation of statistical programs for data analysis. The GCL is currently evaluating the addition of RNA processing for microarrays as a fee for service.

Dr. Zi-Jian Xie - My laboratory has been interested in how Na/K-ATPase functions as signaling receptor and an important cellular scaffolding protein in organization of membrane microdomains and protein complexes. Recent work has identified several protein domains from the a1 subunit of the Na/K-ATPase that play an important role in mediating protein interactions. We have documented that the activation of the receptor function by ouabain can protect the heart from ischemia/reperfusion injury. In addition, in collaboration with Dr. Shapiro's laboratory, we have found that the Na/K-ATPase and its ligands are important regulators of collagen synthesis. Based on these new findings we will focus our effort to further reveal the molecular mechanism of Na/K-ATPase-mediated signal transduction, and assess the role of this newly identified cellular signal transduction mechanism in cardiovascular biology and metabolic diseases.

Research goals and future plans:

Most of our faculty members who are involved in research are interested in remaining involved and advancing their research programs along the above-indicated lines. Changing directions may be necessary for some in order to keep up with the rapidly changing trends and to increase chances of obtaining the necessary extramural support. The Department's plan is to use the available resources to maintain all existing productive programs, but to attempt the expansion of those focused on cardiovascular and metabolic diseases.

4d. Administrative & University Services

The Department faculty, excluding those who have primary administrative assignments (Chairs, Vice Presidents and Deans), estimated and reported that they spend 5,400 hours/year on MUO administrative duties and committee work, and about 1,800 hours/year on such service work (grant and manuscript review, etc.) for external organizations.

5. PUBLICATIONS & GRANTS

5a. Publications

Publications printed or in press, are attached (Attachment 2). Abstracts and presentations are not listed because these have lost much of their professional value, at least in the "basic science" world.

5b. Grants

Funded grants are listed in Table 3 provided by the Research & Grants Office. The list of grants that were applied for, by the faculty of each department, but not funded, are also available from the Research & Grants Office, and have been presented to the Executive Committee. This list should be more reliable than any that we may gather.

6. FACULTY TIME & EFFORT - SEE TABLE 2.

MEDICAL UNIVERSITY
OF OHIO

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All Faculty
College of Medicine
Medical University of Ohio

Dear Colleagues:

An often quoted element of our Commitment to Excellence strategy is Dr. Jacobs' mantra that MUO must become "Narrower, but Deeper." We have charted our course to this goal by identifying five Featured Academic Strategic Tracks (FAST), each with Basic Science and Clinical components, into which we plan significant investment during the next several years. As you, undoubtedly, are aware, these Tracks include: 1) Cardiac and Vascular Sciences, an area which includes underlying metabolic diseases; 2) Selected Cancers; 3) Neurosciences, with particular emphasis on movement disorders and stroke (an obvious interface with the Cardiac and Vascular Sciences Track); 4) Transplantation and Transplant Immunology; and 5) Orthopaedics and Trauma. It is in this regard that I take great pleasure in informing you of two very important steps recently taken to better align our Basic Sciences with the FAST concept.

On January 1 the departments of Physiology and Pharmacology will be merged into a single department, the department of Physiology, Pharmacology, Metabolism and Cardiovascular Sciences. The new name of this department not only recognizes its essential role in the first FAST mentioned above, but also recognizes the areas of important scientific contributions of many of this new department's current faculty. For years, these two departments have housed some of MUO's most productive faculty, many with significant NIH funding directly related to Metabolism and Cardiovascular Sciences. This merger will bring these individuals together under common leadership; a move that I am confident will result in a new department which will be stronger than the sum of its predecessors.

I am particularly pleased to inform you that the Chair of this new department will be Dr. Amir Askari. Dr. Askari, we all recognize as one of MUO's most respected and productive scientists, but some of you may not be aware that he served as Chair of the Department of Pharmacology for over 20 years, prior to stepping down as Chair in 1997. During this time, he built one the strongest basic science departments at MUO. His colleagues still speak with admiration of his abilities to mentor junior faculty and accomplish the other demanding tasks falling to department chairs, while at the same

time managing his own outstanding research program. As a scientist, Dr. Askari remains internationally known for his outstanding research involving Na^+-K^+ ATPase. He has maintained continuous NIH support for his research for over many years, and in 1986 relinquished his own long standing R01 funding in favor of a still-active Program Project grant, currently in its 18th year, on which he continues to be the MUO principal investigator. Dr. Askari also has been very active in NIH matters, serving at various times as a regular member of chartered NIH study sections, as well as a member of the NHLBI advisory council and he just completed a term on the Editorial Board of the Journal of Biological Chemistry

We, indeed, are fortunate that Dr. Askari has agreed to lead this new department. I cannot imagine that a more qualified individual could be found anywhere to amalgamate these two current MUO departments into a single cohesive unit to lead MUO's research and educational endeavors in the Cardiac, Vascular, and Metabolism FAST. Building on the existing faculty strengths in this new department, I am confident that, given Dr. Askari's track record and wisdom, this department will move forward with a true commitment to excellence.

The second step is the formation of a search committee to identify a new Chair for the Department of Medical Microbiology and Immunology. My charge to this committee is for them to recommend to me potential candidates with National/International scientific reputations in the area of Immunology. I will charge the new Chair with the task of establishing an immunology focus with a particularly strong link to transplantation immunology, but also with links to immunologic aspects of other FAST areas, such as Cancer and Cardiovascular Diseases under the leadership of our research committee. We anticipate the arrival of a new Chair in the Fall of 2006.

The above initiatives, in conjunction with others to be announced in the near future, represent important steps in our Commitment to Excellence, but the real key to Excellence is a committed faculty. Without your perennial commitment, hard work and dedication our institutional goals are unattainable. Thank you.

To Our Future Together,

Jeffrey P. Gold, M.D.

ATTACHMENT 2

PUBLICATIONS

Adhikary, G., Gupta, S., Sil, P., Saad, Y., and Sen, S. (2005) Characterization and functional significance of myotrophin: a gene with multiple transcripts. Gene 353:31-40.

Ahmad, N., and Lingrel, J.B. (2005) Kruppel-like factor 2 transcriptional regulation involves heterogenous nuclear ribonucleoproteins and acetyltransferases. Biochemistry 44:6276-6285.

Davies, T.H. and Sanchez, E.R. (2005) FKBP52. An FK506-binding Tetratricopeptide Repeat Protein. "Molecules in Focus". Int. J. Biochem. Cell. Biol. 37:42-47.

Davies, T.H., Ning, Y.M., and Sanchez, E.R. (2005) Differential control of glucocorticoid receptor hormone-binding function by tetratricopeptide repeat (TPR) proteins and the immunosuppressive ligand FK506. Biochemistry 44:2030-2038.

Dmitriev, R.I., Pestov, N.B., Korneenko, T.V., Gerasimova, A.V., Zhao, H., Modyanov, N.N., Kostina, M.B., and Shakhparonov, M.I. (2005) Tissue-specificity of alternative splicing of transcripts encoding hampin, a new protein homologous to msl1. Russian J. Bioorgan. Chem. 31:363-371.

Duggan, J., Okonta, H., and Chakraborty, J. (2006) Transmission of Moloney murine leukemia virus (ts-1) by breast milk. J. Gen. Virol. 87:2679-2684.

Garrett, M.R. and Joe, B. (2006) Genetic studies of inherited hypertension in the rat. Handbook of Hypertension 23: Dominiczak and Connell: Genetics of Hypertension, in press.

Garrett, M.R., Joe, B., and Yerga-Woolwine, S. (2006) Genetic linkage of urinary albumin excretion in Dahl salt-sensitive rats: influence of dietary salt and confirmation using congenic strains. Physiol. Genomics 25:39-49.

Garrett, M.R., Meng, H., Rapp, J.P., and Joe, B. (2005) Locating a blood pressure quantitative trait locus within 117 kb on the rat genome: substitution mapping and renal expression analysis. Hypertension 46:e18-19.

Greenfield, L.J. , Rosenberg, H.C. and Homan, R.W.: Benzodiazepines in The Treatment of Epilepsy: Principles and Practice, 3rd edition, ed. E. Wyllie, Williams and Wilkins, Baltimore, pp. 829-854, 2006.

Huddleson, J.P., Ahmad, N., and Lingrel, J.B. (2005) Up-regulation of the KLF2 transcription factor by fluid shear stress requires nucleolin. J. Biol. Chem. 281:15121-15128.

Huddleson, J.P., Ahmad, N., Srinivasan, S., and Lingrel, J.B. (2005) Induction of KLF2 by fluid shear stress requires a novel promoter element activated by a phosphatidylinositol 3-kinase-dependent chromatin-remodeling pathway. J. Biol. Chem. 280:23371-23379.

Joe, B. (2006) The quest for arthritis-causative genetic factors in the rat. Physiol. Genomics 27:1-11.

Joe, B., Letwin, N.E., Garrett, M.R., Dhindaw, S., Frank, B., Sultana, R., Verratti, K., Rapp, J.P., and Lee, N.H. (2005) Transcriptional profiling with a blood pressure QTL interval-specific oligonucleotide array. Physiol. Genomics 23:318-326.

Kennedy, D.J., Vetteh, S., Periyasamy, S.M., Kanj, M., Fedorova, L., Khouri, S., Kahaleh, M.B., Xie, Z., Malhotra, D., Kolodkin, N.I., Lakatta, E.G., Fedorova, O.V., Bagrov, A.Y., and Shapiro, J.I. (2006) Central role for the cardiotonic steroid marinobufagenin in the pathogenesis of experimental uremic cardiomyopathy. Hypertension 47:488-495.

Kennedy, D.J., Vetteth, S., Xie, M., Periyasamy, S.M., Xie, Z., Han, C., Basrur, V., Federov, V., Mutgi, K., Malhotra, D., and Shapiro, J.I. (2006) Ouabain decreases sarcoplasmic calcium ATPase (SERCA2a) activity in rat hearts by a process involving protein oxidation. Am. J. Physiol. Heart, Epub ahead of print (doi:10.1152/ajpheart.00603.2006).

Koch, L.G., Green, C.L., Lee, A.D., Hornyak, J.E., Cicila, G.T., and Britton, S.L. (2005) Test of the principle of initial value in rat genetic models of exercise capacity. Am. J. Physiol. Regul. Integr. Comp. Physiol. 288:R466-R472.

Kometiani, P., Liu, L., and Askari, A. (2005) Digitalis-induced signaling by Na^+/K^+-ATPase in human breast cancer cells. Mol. Pharmacol. 67:929-936.

Lee, S.J., Ways, J.A., Barbato, J.C., Essig, D., Pettee, K., DeRaedt, S.J., Yang, S., Weaver, D.A., Koch, L.G., and Cicila, G.T. (2005) Gene expression profiling of the left ventricles in a rat model of intrinsic aerobic running capacity. Physiol. Genomics 23:62-71.

Li, D. and Sanchez, E.R. (2005) Glucocorticoid receptor and heat shock factor 1: novel mechanism of reciprocal regulation. Vitam. Horm. 71:239-262.

Liang, M., Cai, T., Tian, J., Qu, W., and Xie, Z.J. (2006) Functional characterization of Src-interacting Na/K-ATPase using RNA interference assay. J. Biol. Chem. 281:19709-19719.

Lilly, S.M., Alvarez, F.J., and Tietz, E.I. (2005) Synaptic and subcellular localization of A-kinase anchoring protein 150 in rat hippocampal CA1 pyramidal cells: Co-localization with excitatory synaptic markers. Neuroscience 134:155-163.

Liu, L. and Askari, A. (2006) Beta-subunit of cardiac Na^+-K^+-ATPase dictates the concentration of the functional enzyme in caveolae. Am. J. Physiol. Cell. Physiol. 291:C569-C578.

Liu, J., Liang, M., Liu, L., Malhotra, D., Xie, Z., and Shapiro, J.I. (2005) Ouabin induced endocytosis of the plasmalemmal Na/K-ATPase in LLC-PK1 cells requires caveolin-1. Kidney Int. 67:1844-1854.

Liu, L., Li, J., Yuan, Z., Pierre, S., Qu, W., Zhao, X., and Xie, Z. (2006) Involvement of Na,K-ATPase in hydrogen peroxide-induced hypertrophy in cardiac myocytes. Free Rad. Biol. Med. 41:1548-1556.

Liu, I.K., Turner, J.W. Jr., Van Leeuwen, E.M., Flanagan, D.R., Hedrick, J.L., Murata, K., Lane, V.M., and Morales-Levy, M.P. (2005) Persistence of anti-zonae pellucidae antibodies following a single inoculation of porcine zonae pellucidae in the domestic equine. Reproduction 129:181-190.

Martin, B.J., Suckow, M.A., Wolter, W.R., Berger, T., and Turner, J.W. Jr. (2006) Use of mucosal immunization with porcine zona pellucida (PZP) in mice and rabbits. Anim. Reprod. Sci. 93:372-378.

Nagaishi, T., Pao, L., Lin, S.-H., Lijima, H., Kaser, A., Qiao, S.-W., Chen, D., Glickman, J., Najjar, S.M., Nakajima, A., Neel, B.G., and Blumberg, R.S. (2006) Dependent T cell inhibition by CEACAM1 isoforms expressing a long cytoplasmic domain. Immunity, in press.

Najjar, S.M., Yang, Y., Fernstrom, M.A., Lee, S.J., Deangelis, A.M., Rjaily, G.A., Al-Share, Q.Y., Dai, T., Miller, T.A. Ratnam, S., Ruch, R.J., Smith, S., Lin, S.H., Beauchemin, N., and Oyarce, A.M. (2005) Insulin acutely decreases hepatic fatty acid synthase activity. Cell Metab. 2:43-53.

Nestor, A.L., Cicila, G.T., Karol, S.E., Langenderfer, K.M., Hollopeter, S.L., and Allison, D.C. (2006) Linkage analysis of neointimal hyperplasia and vascular wall transformation after balloon angioplasty. Physiol. Genomics 25:286-293.

Oweis, S., Wu, L., Kiela, P.R., Zhao, H., Malhotra, D., Ghishan, F.K., Xie, Z., Shapiro, J.I., and Liu, J. (2006) Cardiac glycoside downregulates NHE3 activity and expression in LLC-PK1 cells. Am. J. Physiol. Renal Physiol. 290:F997-F1008.

Park, S.Y., Cho, Y.R., Kim, H.J., Hong, E.G., Higashimori, T., Lee, S.J., Goldberg, I.J., Shulman, G.L., Najjar, S.M., and Kim, J.K. (2006) Mechanism of glucose intolerance in mice with dominant negative mutation of CEACAM1. Am. J. Physiol. Endocrinol. Metab. 291:E517-E524.

Periyasamy, S.M., Liu, J., Tanta, T., Kabak, B., Wakefield, B., Malhotra, D., Nadoor, O., Fedorova, O.V., Gunning, W,, Xie, Z., Bagrov, A.Y., and Shapiro, J.I. (2005) Salt loading induces redistribution of the plasmalemmal Na/K-ATPase proximal tubule cells. Kidney Int. 67:1868-1877.

Pestov, N.B., Korneenko, T.V., Shakhparonov, M.I., Shull, G.E., and Modyanov, N.N. (2006) Loss of acidification of anterior prostate fluids in Atp12a-null mutant mice indicates that nongastric H-K-ATPase functions as proton pump in vivo. Am. J. Physiol. Cell. Physiol. 291:C366-C374.

Pierre, S.V. and Xie, Z. (2006) The Na,K-ATPase receptor complex: its organization and membership. Cell Biochem. Biophys., in press.

Plutner, H., Gurkan, C., Wang, X., LaPointe, P., and Balch, W.E. (2005) Microsome-based assay for analysis of endoplasmic reticulum to Golgi transport in mammalian cells. In: Cell Biology: A Laboratory Handbook, Volume 2, Third Edition, J.E. Celis, editor, Elsevier, San Diego, pages 209-214..

Pressley, T.A., Duran, M.J., and Pierre, S.V. (2005) Regions conferring isoform-specific function in the catalytic subunit of the Na,K-pump. Front. Biosci. 10:2018-2026.

Roman, R.J., Hoagland, K.M., Lopez, B., Kwitek, A.E., Garrett, M.R., Rapp, J.P., Lazar, J., Jacob, H.J., and Sarkis, A. (2006) Characterization of blood pressure and renal function in chromosome 5 congenic strains of Dahl S rats. Am. J. Physiol. Renal Physiol. 290:F1463-F1471.

Tian, J., Cai, T., and Xie, Z-J. (2005) Na^+/K^+-ATPase alpha 1 subunit. AfCS-Nature Signaling Gateway (A002647).

Tian, J., Cai, T., Yuan, Z., Wang, H., Liu, L., Haas, M., Maksimova, E., Huang, X.Y., and Xie, Z.J. (2006) Binding of Src to Na^+/K^+-ATPase forms a functional signaling complex. Mol. Biol. Cell 17:317-326.

Wang, X., Venable, J., LaPointe, P., Hutt, D.M., Koulov, A., Coppinger, J., Gurkan, C., Kellner, W., Matteson, J., Plutner, H., Riordan, J.R., Kelly, J.W., Yates III, J.R., and Balch, W.E. (2006) Hsp90 co-chaperone Aha1 resuce of the human misfolding disease cystic fibrosis. Cell, in press.

Weaver, D.A., Crawford, E.L., Warner, K.A., Elkhairi, F., Khuder, S.A., and Willey, J.C. (2005) ABCC5, ERCC2, XPA and XRCC1 transcript abundance levels correlate with cisplatin chemoresistance in non-small cell lung cancer cell lines. Mol. Cancer 4:18.

Wisloff, U., Najjar, S.M., Ellingsen, O., Haram, P.M., Swoap, S., Al-Share, Q., Fernstrom, M., Rezaei, K., Lee, S.J., Koch, L.G., and Britton, S.L. (2005) Cardiovascular risk factors emerge after artificial selection for low aerobic capacity. Science 307:418-420.

Xie, Z. and Xie, J. (2005) The Na/K-ATPase-mediated signal transduction as a target for new drug development. Frontiers Biosci. 10:3100-3109.

Yang, Z., Wolf, I.M., Chen, H., Periyasamy, S., Chen, Z., Yong, W., Shi, S., Zhao, W., Xu, J., Srivastava, A., Sanchez, E.R., and Shou, W. (2006) FKBP52 is essential to uterine reproductive physiology controlled by the progesterone receptor A isoform. Mol. Endocrinol., in press (epub ahead of print, doi:10.1210/me.2006-0024).

Yuan, Z., Cai, T., Tian, J., Ivanov, A.V., Giovannucci, D.R., and Xie, Z. (2005) Na/K-ATPase tethers phospholipase C and IP3 receptor into a calcium-regulatory complex.. Mol. Biol. Cell 16:4034-4045.

ATTACHMENT 3

For the information of the reader, below you will find a complete list of Faculty, Staff and Students who, at the time of this report, are working in Physiology, Pharmacology, Metabolism and Cardiovascular Sciences.

FACULTY

Nisar Ahmad, Ph.D., Assistant Professor
Amir Askari, Ph.D., Professor & Chairman
Andrew Beavis, Ph.D., Associate Professor & Education Director
Paul Brand, Ph.D., Associate Professor
Joana Chakraborty, Ph.D., Professor
George Cicila, Ph.D., Associate Professor
Michael Garrett, Ph.D., M.B.A., Assistant Professor
Bina Joe, Ph.D., Assistant Professor
Soon Jin Lee, Ph.D., Assistant Professor
Lijun Liu, M.D., M.S., Assistant Professor
Ronald Mellgren, Ph.D., Professor
Patricia Metting, Ph.D., Professor & Associate Dean for Student Affairs, College of Medicine
Nikolai Modyanov, Ph.D., Professor
Sonia Najjar, Ph.D., Professor, Director of CeDER
Ana Maria Oyarce, Ph.D., Assistant Professor
Sumudra Periyasamy, Ph.D., Assistant Professor
Sandrine Pierre, Ph.D., Assistant Professor
Howard Rosenberg, M.D., Ph.D., Professor
Yasser Saad, Ph.D., Assistant Professor
Edwin Sanchez, Ph.D., Professor
Elizabeth Tietz, Ph.D., Professor & Vice Chairman
John W. Turner, Jr., Ph.D., Professor
Xiaodong Wang, Ph.D., Assistant Professor
R. Douglas Wilkerson, Ph.D., Professor, Associate Vice President for Research, Associate Dean COM Graduate Program
David A. Weaver, D.D.S., Ph.D., Assistant Professor
Zi-Jian Xie, Ph.D., Professor

VISITING SCIENTIST

Luis Eduardo M. Quintas

OFFICE STAFF

Elizabeth Akeman, Administrative Assistant (CeDER)
Anita Easterly, Administrative Secretary 2
Karen Edwards, Assistant to the Chairman
Martha Heck, Data Systems Coordinator 1
Debra Meyer, Administrative Secretary 2
Marianne Miller Jasper, Administrative Secretary 2
Shirley Wozniak, Research Assistant

RESEARCH STAFF

Elaine Chalfin, Research Assistant
Ruth Dohse, Research Assistant
Kris Farms, Senior Research Technician
William Ferencak III, Research Assistant
Mats Fernstrom, Biomedical Research Assistant
Marge Gable, Biomedical Research Assistant
Tina Hogan, Research Technician
Jennifer Kalisz, Biomedical Research Assistant
Ezhilarasi Manickavasagam, Research Technician
Kimberly Morton, Research Assistant
Henry Okonta, CQI Coordinator
Krista Pettee, Research Technician
Elisabeth Philbrick, Laboratory Assistant
Jiang Tian, Biomedical Research Assistant
Manoranjani Tillekeratne, Biomedical Research Assistant
Julie Warner, Lab Tech 1
Joseph Xie, Research Assistant
Shane Yerga-Woolwine, Senior Research Technician
Xiaochen Zhao, Biomedical Research Assistant

POSTDOCTORAL FELLOWS

Ting Cai, M.D.
Paromita Das, Ph.D.
Weikai Qu, Ph.D.
Jill Schroeder-Gloeckler, Ph.D.

GRADUATE STUDENTS

Qusai Al-Share (Ph.D.)
Ananya Banerjee (Ph.D.)
Thomas Bowman (Ph.D.)
Yiliang Chen (Ph.D.)
Ying Chen (Ph.D.)
Anthony DeAngelis (Ph.D.)
Seema Dhindaw (Ph.D.)
Benjamin Hart (Ph.D.)
Garrett Heinrich (Ph.D.)
Terry Hinds (Ph.D.)
Sang Jun Lee (Ph.D.)
Zhichuan Li (Ph.D.)
Jehnan Liu (M.D./Ph.D.)
Sam Lupica (Ph.D.)
Andrew McSweeny (MSBS)
Payal Patel (Ph.D.)
Rossen Radkov (Ph.D.)
Gargi Roy (Ph.D.)

Jagannath Saikumar (Ph.D.)
Anita Saxena (Ph.D.)
Guofu Shen (Ph.D.)
Jun Song (Ph.D.)
Cory Stebal (Ph.D.)
Ed Toland (Ph.D.)
Uzma Waheed (MSBS)
Manya Warrier (Ph.D.)
Justin Ways (Ph.D.)
Irene Wolf (Ph.D.)
Kun Xiang (Ph.D.)
Changjun Yang (Ph.D.)
Shadi Zahedi (Ph.D.)

WORK STUDY STUDENTS

Kerri Gibson
Ajit Jada
Eric Morgan
Matthew Packard

VOLUNTEERS

Akram Alhusini
Matthew Gibson
Bahaa Hariri
Shane Jeffers
Nicole McKenzie
Kevin Okapal
Eugene Orlowski
Chintan Shaw

			College of Medicine													
Faculty Full Name	**Total hr**	**COM hr**	OS1	OS2	OS3	OS4	OS5	OS6	OS total	CMB	I and I	FCP	PBL		MP	GCMS
Amir Askari, Ph.D.	0	0	0						0							
Nisar Ahmad, PhD	0	0							0							
Andrew D. Beavis, Ph.D.	161.5	37.5	6	4		8	4	4	26		4		18			
Paul H. Brand, Ph.D.	72	46	0	12	3	11	4		30				18			16
Joana Chakraborty, Ph.D.	84.5	52.5	0					1	1	14		1			18	14
George T. Cicila, Ph.D.	16.5	16.5	0						0	8			18			
Lee E. Faber, Ph.D.	0	0	0						0				0			
Michael R. Garrett, M.S., M.B.A.	0	0	0						0	0						
Bina Joe, Ph.D.	3.5	3.5	0						0	0			18			
Soon Jin Lee, Ph.D.	3	3	0						0	0						
Lijun Liu, M.D., M.S.	0	0	0						0							
Ronald L. Mellgren, Ph.D.	44	28.5	7						7		11					
Patricia J. Metting, Ph.D.	25	25	0			24			24							
Nikolai Modyanov, Ph.D.	6	6	0						0				18			
Sonia M. Najjar, Ph.D.	7	7	0				3		3							
Ana Maria Oyarce, Ph.D.	4	4	0						0							
Sumudra Periyasamy, Ph.D.	0	0	0						0							
Sandrine Pierre, Ph.D.	0	0	0						0							
Howard C. Rosenberg, M.D., Ph.D.	40.5	17.5	2.5	4	10			1	17.5				18			
Yasser Saad, Ph.D.	0	0	0						0							
Edwin R. Sanchez, Ph.D.	21	17	3				2	2	7							
Keith K. Schlender, Ph.D.	6	6	0				2	2	4							
Elizabeth I. Tietz, Ph.D.	14.5	14.5	0		5				5							
John W. Turner Jr., Ph.D.	32	32	0				14	12	26							
Xiaodong Wang, Ph.D.	0	0	0						0							
David A. Weaver, D.D.S., Ph.D.	2	2	0						0							
Robert D. Wilkerson, Ph.D.	17	17	3	12	2				17							
Zi-Jian Xie, Ph.D.	18	9	0		6		1		7							
Pittman	7									4						
Total Hours	585	344.5	21.5	32	26	43	30	22	174.5	26	15	1	108	0	18	30
John Greenfield (Joint Appointment)					2											
Didactic Hours included in "Total hr"																
(Excludes small group PBL)																

TABLE 1

Block/Course Director (PPMCVS)	ABBR.	Course	Hours	Course number
Chakraborty (175 hr)	CMB	Cellular and Molecular Biology (COM)	26	INDI 775
Rosenberg (399 hr)	OS	Organ Systems (COM)	174.5	INDI 780
	I and I	Immunity and Infection (COM)	15	INDI 783
Chakraborty (6 hr unit director)	FCP	Fundamentals of Clinical Practice	1	INDI 786
	PBL	Integrative Pathophysiology I (COM) - small group	108	INDI 777
Chakraborty (18 hr unit director)	MP	Anatomy/Physiology - Medical Physics (CGS)	18	MPHY 631.001
Chakraborty (30 hr)	GCMS	Human Physiology - Graduate Certificate in Medical Science (CGS)	30	PHYS 505.002
	MCB	Molecular and Cellular Biology (PhD CGS)	21	INDI 684
Turner (62 hr)	MBD	Molecular Basis of Disease (PhD, CGS)	15	MBDP 603
	CMN	Principles of Cellular and Molecular Neurobiology (PhD, CGS)	4	CMNP 601
Sanchez (42 hr)	Signals	Receptors and Signal Transduction (PhD, CGS)	28	PHRM 607
	Methods	Methods in Molecular Cell Biology (PhD, CGS)	7.5	MCBP 601
	Bioinf	Fundamentals of Bioinformatics, Proteomic and Gemomics (PhD, CGS)	5	BIPG 510
	OBS	On Being a Scientist (PhD, CGS)	1.5	INDI 602
Beavis (66 hr)	PA Pharm	Fundamentals of Pharmacology I, spring (PA Program) (CHS)	110	PHYA 551
Beavis (40 hr)	PA Pharm	Fundamentals of Pharmacology II, summer (PA Program) (CHS)		PHYA 552
Beavis (27 hr)	PA Pharm	Fundamentals of Pharmacology III, fall (PA Program) (CHS)		PHYA 553
Chakraborty (36 hr)	PA Phys	Human Physiology (PA program) (CHS)	36	PHYS 505.001
	PT Phys	Clinical Pathophysiology (Physical Therapy Program) (CHS)	22	PT411
Beavis (25 hr unit director)	HDS Pharm	Scientific and Clinical Foundations for Human Organ Donation and Transplantation (Human Donation Science Certificate program) (CHS)	25	HDSC 521
	Mol epi	Molecular Epidemiology (CHS?)	5	
Beavis (47 hr)	NP Pharm	Advanced Pharmacotherapeutics (MSN, CON)	40.5	NURS 569.01
		Total	693	
		Total minus PBL	585	

College of Health Sciences and HS					College of Graduate Studies							
PA Pharm	PA Phys	PT Phys	HDS Pharm	NP Pharm	MCB	Methods	Signals	MBD	Bioinf	CMN	OBS	Mol Epi
72			25	27	7.5							
	18	8										
	18	14			1.5			3				
						1.5		3	2			2
					1.5				2			
						3						
11				4.5	4.5		6					
								1				
					6							
								2				2
							4					
14				9								
4							10					
							2					
							4			4	1.5	
								6				
									1			1
9							2					
						3						
110	36	22	25	40.5	21	7.5	28	15	5	4	1.5	5

TABLE 2

FACULTY TIME & EFFORT

NAME	RESEARCH	TEACHING	SERVICE	TOTAL
Amir Askari, Ph.D.	40%	0%	60%	100%
Andrew Beavis, Ph.D.	0%	56%	44%	100%
Paul Brand, Ph.D.	0%	99%	1%	100%
Joana Chakraborty, Ph.D.	25%	65%	10%	100%
George Cicila, Ph.D.	70%	27%	3%	100%
Michael Garrett, Ph.D., M.B.A.	85%	5%	10%	100%
Bina Joe, Ph.D.	65%	25%	10%	100%
Soon Jin Lee, Ph.D.	94%	5%	1%	100%
Lijun Liu, M.D., M.S.	100%	0%	0%	100%
Ronald Mellgren, Ph.D.	40%	40%	20%	100%
Nikolai Modyanov, Ph.D.	60%	25%	15%	100%
Sonia Najjar, Ph.D.	40%	20%	40%	100%
Ana Maria Oyarce, Ph.D.	75%	15%	10%	100%
Sumudra Periyasamy, Ph.D.	85%	0%	15%	100%
Sandrine Pierre, Ph.D.	90%	10%	0%	100%
Howard Rosenberg, M.D., Ph.D.	0%	95%	5%	100%
Yasser Saad, Ph.D.	82%	11%	7%	100%
Edwin Sanchez, Ph.D.	30%	40%	30%	100%
Elizabeth Tietz, Ph.D.	60%	15%	25%	100%
John W. Turner, Jr., Ph.D.	45%	40%	15%	100%
Xiaodong Wang, Ph.D.	80%	18%	2%	100%
David Weaver, D.D.S., Ph.D.	93%	2%	5%	100%
R. Douglas Wilkerson, Ph.D.	0%	5%	95%	100%
Zi-Jian Xie, Ph.D.	50%	30%	20%	100%

MCOAcct#	BudgetPeriod	BudgetPeriod	ProjectPeriod:	FundingCycle	PIName	PublicTitle	AwardingAgencyName	AwardedTotalC	AwardedTotalF	AwardedTotalC	SubcontractorOutgoing	OutgoingAgre	Status	ProposedTotalDir	ProposedFandACosts	ProposedTotalCo
93654403	07/01/05	12/31/06	07/01/03	12/31/06	Najjar, Sonia	Insulin Signaling in Fat Metabolism	American Diabetes Association-Nat	$86,956	$13,043	$99,999			Funded-X	$89,956.00	$13,043.00	$102,999.00
93655601	04/01/06	03/31/07	04/01/06	03/31/08	Wang, Xiaodong	Mechanism Of Temperature-Dependent Export of DeltaF508 CFTR	Cystic Fibrosis Foundation	$90,000	$7,200	$97,200			Funded	$90,000.00	$7,200.00	$97,200.00
94235006	03/01/06	02/28/07	03/01/00	02/28/09	Najjar, Sonia	Ceacam and Insulin Action	National Institute of Diabetes, Diges	$214,830	$103,763	$318,593			Funded	$220,000.00	$106,260.00	$326,260.00
94251504	07/01/05	06/30/06	07/25/02	06/30/07	Xie, Zi-Jian	The Role of ROS and Na/K-ATPase in Uremic Cardiomyopathy	National Heart, Lung & Blood Instit	$175,000	$82,250	$257,250			Expired	$175,000.00	$82,250.00	$257,250.00
94254302	04/01/06	03/31/07	04/01/05	03/31/10	Tietz, Elizabeth	Benzodiazepine-induced Glutamate Receptor Plasticity	National Institute on Drug Abuse	$193,739	$81,878	$275,617	Wright State University	$19,530.00	Funded	$200,000.00	$94,000.00	$294,000.00
94254901	08/01/05	06/30/06	08/01/05	06/30/10	Sanchez, Edwin	TPR Proteins in Steroid Receptor Signaling and Physiology	National Institute of Diabetes, Diges	$190,000	$85,124	$275,124	Indiana University	$76,000.00	Expired	$250,000.00	$84,525.00	$334,525.00
94430019	03/01/06	02/28/07	07/01/86	02/28/08	Askari, Amir	Control Mechanisms of Cardiac Proteins & Enzymes	National Heart, Lung & Blood Instit	$1,000,771	$361,294	$1,362,065	Portland State Universit	$232,061.00	Funded	$1,003,228.00	$391,617.00	$1,394,845.00
94512006	03/21/06	06/02/06	03/21/01	06/02/06	Lilly, Scott M.	VIP Receptor Distribution and GABA Receptor Interactions	National Institute on Drug Abuse	$7,108	$0	$7,108			Expired	$14,618.00	$0.00	$14,618.00
94723601	09/26/05	06/30/06	09/26/05	06/30/06	Pierre, Sandrine	Physiological Significance of Na, K-pump Diversity	National Center for Research Reso	$36,480	$17,620	$54,100			Funded	$36,480.00	$17,620.00	$54,100.00
94723701	09/01/05	08/31/06	09/01/05	08/31/06	Najjar, Sonia	Dietary and Genetic Risk Factors in Obesity and Diabetes	U.S. Department of Agriculture	$131,073	$59,927	$191,000			Funded	$131,073.00	$59,927.00	$191,000.00
93654101	07/01/05	06/30/06	07/01/03	06/30/07	Pittman, Douglas L.	Understanding the Roles of RAD51-Related Genes in Cancer Initiation	American Cancer Society - National	$154,077	$30,816	$184,693			Expired	$154,078.00	$30,816.00	$184,894.00
93655101	07/01/05	06/30/06	07/01/05	06/30/07	Pittman, Douglas L.	Characterizing the RAD51D E233G High-Risk Breast Cancer Allele	Ohio Cancer Research Associates	$22,727	$2,273	$25,000			Funded	$22,727.00	$2,273.00	$25,000.00
93655201	07/01/05	06/30/06	07/01/05	06/30/06	Chakraborty, Joana	Virus Induced Maternally Inherited Lymphoma	American Cancer Society - Ohio Di	$27,273	$2,727	$30,000			Expired	$27,273.00	$2,727.00	$30,000.00
93656001	07/01/05	06/30/07	07/01/05	06/30/07	Chakraborty, Joana	Maternally Inherited Retrovirus Inducted Lymphoma in a Mouse Model	F.M. Douglass Foundation	$21,170	$0	$21,170			Funded-X	$21,170.00	$0.00	$21,170.00
94249029	12/01/05	11/30/06	06/01/86	11/30/08	Joe, Bina	Biochemistry and Genetics of Hypertension	National Heart, Lung & Blood Instit	$421,633	$198,168	$619,801			Funded	$431,780.00	$202,937.00	$634,717.00
94251904	12/01/05	11/30/06	12/16/02	11/30/06	Cicila, George	Identifying Chromosome 3 Blood Pressure QTL Candidates	National Heart, Lung & Blood Instit	$195,300	$91,791	$287,091			Funded	$200,000.00	$94,000.00	$294,000.00
94254003	06/01/06	05/31/07	07/01/04	05/31/08	Joe, Bina	Functional Genomic Dissection of Rat Blood Pressure QTL	National Heart, Lung & Blood Instit	$284,170	$55,631	$339,801	The Institute for Genom	$168,993.00	Funded	$179,905.00	$168,073.00	$347,978.00
								$3,252,307	$1,193,505	$4,445,812						

TABLE 3